User's Manual

R-UNDELETE™

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I Introduction to R-Undelete

R-Undelete is a powerful and cost-effective undelete and data recovery software. Empowered by the new unique data recovery technologies, it is the best data recovery solution for recovering files from FAT12/16/32, NTFS, and NTFS5 (created or updated by Windows NT 4.0, 2000, XP, 2003, Vista, 7.) logical disks. Flexible parameter settings give you absolute control over the data recovery.

R-Undelete Features
System Requirements and Installation Notes
Contact Information and Technical Support
Data Recovery Using R-Undelete
Disk Image
Hexadecimal Viewer
Data Recovery Issues
Extended Information Recovery
S.M.A.R.T. data

1.1 R-Undelete Features

R-Undelete features:

- Wizard-oriented interface.
- Host OS: Windows XP, 2003, Vista, 7, 8/8.1, Server 2012, Windows 10.
- Supported file systems: FAT12, FAT16, FAT32, NTFS, NTFS5 (created and updated by Windows 2000/ XP/2003/Vista/7/8/8.1, Server 2012, 10), ReFS.
- Support for known file types. **R-Undelete** searches for files with known typical features of their structures allowing the user to search for files on devices with unknown files systems, including an HD, CD, DVD, floppy disk, Compact Flash Card, USB drive, ZIP drive, Memory Sticks, and other removable media.
- Detailed scan process visualization. While searching an object, **R-Undelete** graphically shows items that have been found, including files of known types, FAT and NTFS MFT records, boot records, etc.
- Dynamic disk support.
- Creates image files for logical disks and hard drives. Such image files can be processed like regular disks. **R-Undelete** can scan objects while creating their images.
- Recovers compressed files (NTFS, NTFS5).
- Recovers encrypted files (NTFS5).
- Recovers alternative data streams (NTFS, NTFS5).
- Recognizes localized names.
- Recovered files can be saved on any (including network) disks visible by the host operating system.
- A hexadecimal disk and file viewer.
- File preview. Most of the file types can be previewed to estimate recovery chances.
- Support for S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) attribute monitoring.
- Installation on a removable device. This feature is useful when lost files reside on a system disk and program installation may overwrite them making their recovery impossible.

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R-Undelete recovers files:

- That have been removed without **Recycle Bin**, or when **Recycle Bin** has been emptied;
- Removed by virus attack or power failure;
- From deleted or corrupted logical disks or partitions

R-Undelete can create image files for a logical disk or hard drive. Such image files can be processed like regular disks. Images are very useful if there is a risk of total data loss due to hardware malfunction. If bad blocks are constantly appearing on a hard drive, the only way to save the data is to immediately create an image of that drive. All data search and recovery can be done from this image.

1.2 System Requirements and Installation Notes

System Requirements

- An Intel-compatible platform running Windows XP, 2003, Vista, 7, 8/8.1, Server 2012, Windows 10.
- At least 32 MB of RAM, a mouse, and enough disk space for recovered files, image files, etc.
- The administrative privileges are required to install and run **R-Undelete** under Windows /XP/2003/ Vista/7/8/8.1/Server 2012/Windows 10.

Installation Notes

NEVER install any software or write any data on the disk where lost data resides! Or you may damage or even completely lose the data.

See the **Data Recovery Issues** topic for details.

If the lost data resides on your system disk (usually C:):

Create a portable version.

You may create a portable version on any removable media. When installing **R-Undelete**, select Create portable version on the **R-Undelete** installation wizard and specify the device with removable storage.

R-Undelete portable is installed in the `R-Undelete` folder in the device root. Also the `autorun.inf` file is created and any time the device is connected, **R-Undelete** will start automatically. If you do not want that, simply delete the `autorun.inf` file from the device and start **R-Undelete** portable by launch the `r-undelete.exe` from the `R-Undelete` folder.

Use another computer

1. Install **R-Undelete** on a second computer.
2. Disconnect the hard drive with the lost data from the computer where it has been hosted (the primary computer).
3. Connect the hard drive to the second computer. You may connect it as a second hard drive or use an HDD-to-USB 2.0 adapter.
4. Run **R-Undelete** on the second computer and recover the data.

Now you may reconnect the hard drive to the first computer.

1.3 Contact Information and Technical Support

To obtain the latest version of **R-Undelete**, go to:

Product Site: http://www.r-undelete.com/

Sales Department: sales@r-tt.com

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R-Undelete Technical Support Team is available 24 hours a day, seven days a week, and has an average response time less than 4 hours.

Tech. Support: support@r-tt.com
Send your support request to: http://www.r-tt.com/SupportRequest.shtml

File Recovery FAQ: http://www.r-tt.com/File_Recovery_FAQ.shtml
R-tt Forum: http://forum.r-tt.com

II Data Recovery Using R-Undelete

NEVER TRY TO SAVE RECOVERED FILES/FOLDERS TO THE SAME LOGICAL DISK WHERE THEY RESIDE!!!
Or you may obtain unpredictable results and lose all of your data.

See the **Data Recovery Issues** topic for details.

You may start data recovery with R-Undelete directly from Windows Explorer.

Right-click the disk in **Windows Explorer** and select **Find recently deleted files with R-Undelete** on the shortcut menu

Note: If you try to start **R-Undelete** under an account without administrative rights, you will have to enter an administrative password on the User Account Control dialog box.

Changing the program language

You may select the language of **R-Undelete**. To do so, click the **About** button, then the **Language** button on the Copyright panel, and select an available language.

Depending on your situation, you will need to:

- Recover lost files from an existing logical disk
- Recover lost files from a deleted logical disk
- Create or load a disk image

You make the selection on the **Step1.** Select disk panel

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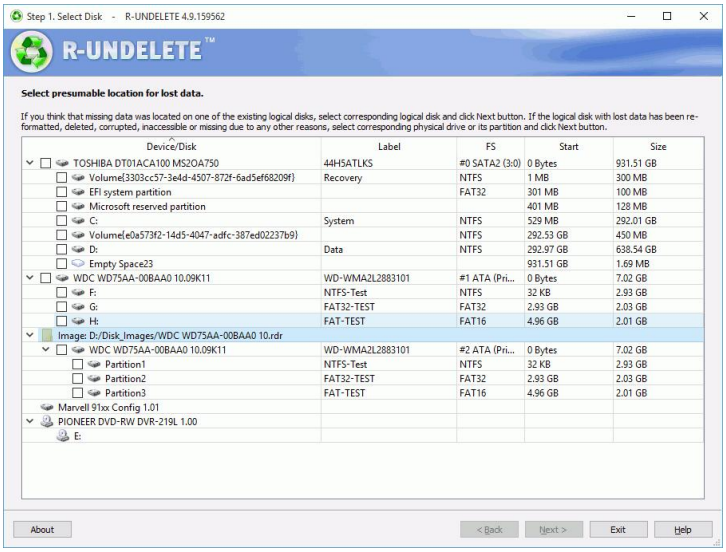
Step1. Select disk ***panel***



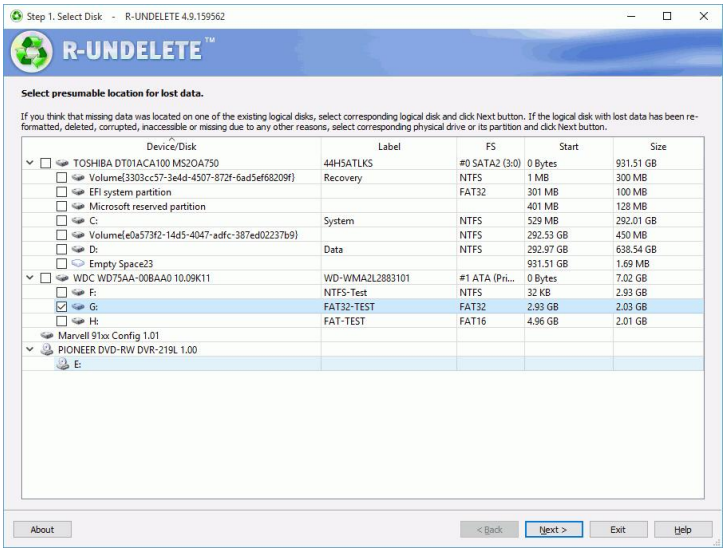
2.1 Recover Lost Files from Existing Logical Disks

Note: If you have done all the operations listed below, but still cannot find your lost files, you need to perform an exhaustive search for the files on the logical disk.

To recover deleted files from a logical disk,

1 **Select the logical disk on the R-Undelete** Step1. Select disk **and click the Next button,**
or double-click the disk.

Step1. Select disk ***panel***



You may start data recovery with **R-Undelete** directly from Windows Explorer.

Right-click the disk in **Windows Explorer** and select **Find recently deleted files with R-Undelete** on the shortcut menu

Note: If you try to start **R-Undelete** under an account without administrative rights, you will have to enter an administrative password on the User Account Control dialog box.

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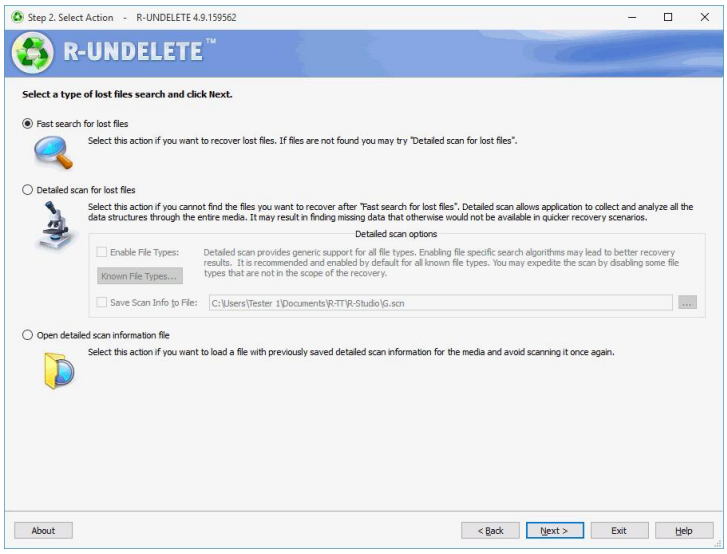
2 Select Fast search for recently deleted files on the Step 2. Select action **panel and click the Next button**

Step 2. Select action ***panel***

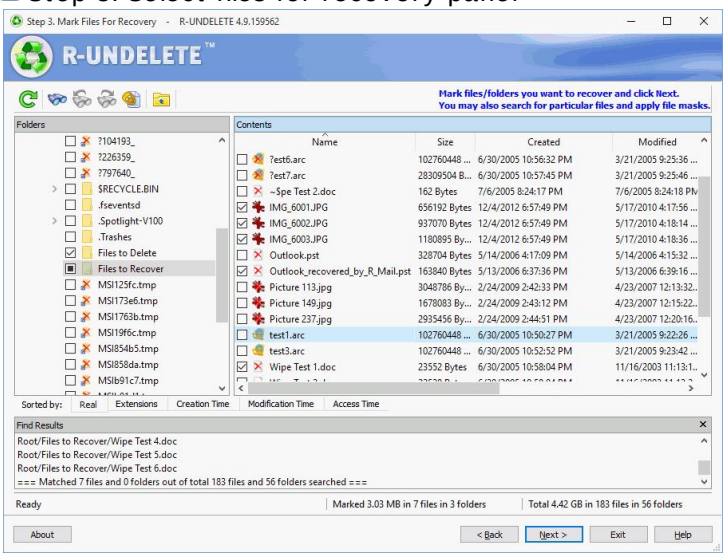

Step 2. Select Action - R-UNDELETE 4.9.159562
R-UNDELETE
Select a type of lost files search and click Next.
Fast search for lost files
Select this action if you want to recover lost files. If files are not found you may try "Detailed scan for lost files".
Detailed scan for lost files
Select this action if you cannot find the files you want to recover after "Fast search for lost files". Detailed scan allows application to collect and analyze all the data structures through the entire media. It may result in finding missing data that otherwise would not be available in quicker recovery scenarios.
Detailed scan options
Enable File Types:
Detailed scan provides generic support for all file types. Enabling file specific search algorithms may lead to better recovery results. It is recommended and enabled by default for all known file types. You may expedite the scan by disabling some file types that are not in the scope of the recovery.
Known File Types...
Save Scan Info to File:
C:\Users\Tester 1\Documents\R-TT\R-Studio\G.scn
Open detailed scan information file
Select this action if you want to load a file with previously saved detailed scan information for the media and avoid scanning it once again.
About
< Back
Next >
Exit
Help

> **R-Undelete will change its panel showing the disk's folders/files structure**

R-Undelete analyzes data on the disk and displays all files which records have been found. Then deleted files, which records still remain, can be recovered. If files have not been found, that means that their records have been deleted. To find such files, Detailed Scan is required.

Please note that **R-Undelete** shows only those files/folders that match a specified file mask.

Step 3. Select files for recovery panel



Panel view options

You may select which columns will be shown on the Contents pane. Right-click the table header and select the required ones. You may also arrange the data as required. Select the required arrangement on the Mark files for

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recovery panel.

Buttons

Find
Click this button to find a particular file/folder.
R-Undelete searches for files only among files specified by a **File Mask**.

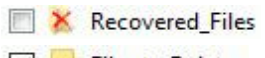
Find Next
Click this button to find the next object specified in the **Find** dialog window.

Find Previous
Click this button to find the previous object specified in the **Find** dialog window.

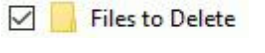
File Mask
Click this button to specify a file mask.

Up
Click this button to move highlighting one folder up.

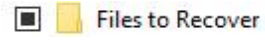
Folders panel



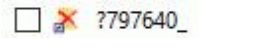
Deleted folder



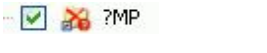
Marked folder (all child objects in this folder are marked)



Partially marked folder (some child objects in this folder are marked)



Cross-linked deleted folder (A FAT folder containing data which also belongs to other FAT folders.)



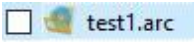
Questionable Cross-linked deleted folder (A FAT folder found by **R-Undelete**, but with apparently invalid content.)

You may also arrange the data as required: by their extensions, creation/modification time, or as a real file structure

Files panel:

Deleted file:

Marked deleted file



Selected deleted file

The Find Results panel.
Appears when File Search has been performed

Find Results
Find All "File Extensions: doc", "G: -> WDC WD75AA-00BAA0 10.09K11 : WD-WMA2L2883101\"
Root/Files to Recover/~Spe Test 2.doc
Root/Files to Recover/Wipe Test 1.doc
Root/Files to Recover/Wipe Test 2.doc
Root/Files to Recover/Wipe Test 3.doc
Root/Files to Recover/Wipe Test 4.doc
Root/Files to Recover/Wipe Test 5.doc
Root/Files to Recover/Wipe Test 6.doc
=== Matched 7 files and 0 folders out of total 183 files and 56 folders searched ===

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Log panel:

3 Select file(s)/folder(s) to recover and click the Next button

Mark a file/folder to recover by clicking the box left to the object, or select **Mark** on the shortcut menu. You may mark several files/folders in different parent folders. You may mark all objects in the folder by selecting **Mark All** on the shortcut menu. To unmark an object, click the box left to the object once more or select **Unmark** on the shortcut menu. You may unmark all objects in the folder by selecting **Unmark All** on the shortcut menu.

R-Undelete can search for a particular file. Go to the Searching for a File topic for details.

File content may be previewed before recovery. Go to the Previewing Files topic for details.

If you do not find files that you want to recover:

Sometimes **R-Undelete** can find the files but not the entire file paths to them. It puts such files into the **Extra Found Files** folder. Try to search for the files there. If that does not help, try to find them by using file search globally on the entire disk. Go to the Searching for a File topic for details

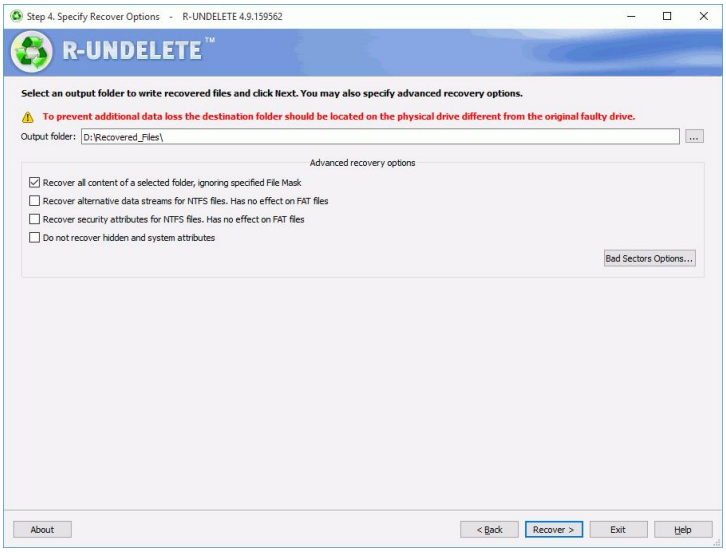
If you still cannot find files that you want to recover but are sure they have existed on the logical disk, you need to use Detailed Scan to find them.

4 Specify recover options and output folder on the Step 4. Select place for recovered files **panel and click the Recover button**

NEVER TRY TO SAVE RECOVERED FILES/FOLDERS TO THE SAME LOGICAL DISK WHERE THEY RESIDE!!!

Or you may obtain unpredictable results and lose all of your data.

Step 4. Select place for recovered files ***panel***


Step 4. Specify Recover Options - R-UNDELETE 4.9.159562
R-UNDELETE
Select an output folder to write recovered files and click Next. You may also specify advanced recovery options.
To prevent additional data loss the destination folder should be located on the physical drive different from the original faulty drive.
Output folder: D:\Recovered_Files\
Advanced recovery options
Recover all content of a selected folder, ignoring specified File Mask
Recover alternative data streams for NTFS files. Has no effect on FAT files
Recover security attributes for NTFS files. Has no effect on FAT files
Do not recover hidden and system attributes
Bad Sectors Options...
About
< Back
Recover >
Exit
Help

Recover options

Recover real folders structure	Enabled when the files are sorted by their extensions or date. If this check box is selected, **R-Undelete** recovers the real folders/files structure on the disk rather than that of sorted files.
Recover all content of a selected folder, ignoring specified file mask:	If this check box is selected, **R-Undelete** recovers all content of selected folder(s), ignoring specified **File Mask**.

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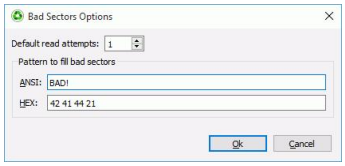
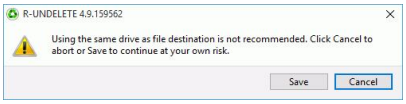
Recover alternative data streams:	If this check box is selected, **R-Undelete** recovers alternative data streams for NTFS files. Has no effect on FAT files. See **Extended Information Recovery** for details.
Recover security attributes:	If this check box is selected, **R-Undelete** recovers security attributes for NTFS files. Has no effect on FAT files. See **Extended Information Recovery** for details.
Do not recover hidden and system attributes	If this check box is selected, **R-Undelete** will remove the Hidden and System attributes from recovered files enabling the user to see them in the Windows Explorer.
Bad Sectors Options	You may specify how to process files with bad sectors. You may specify the number of attempts to read the bad sectors and a pattern to fill the bad block. **R-Undelete** treats bad sectors in the following way: It reads a certain part of disk (predefined by Windows) and • If Default read attempts is set to 0, the entire part with bad sectors will be filled with the specified pattern. • If Default read attempts is set to a non-zero value, **R-Undelete** reads again that part sector by sector, repeating the attempts the specified number of times. If **R-Undelete** still cannot read a bad sector, it fills the sectors with the specified pattern. In this case only the bad sectors will be filled with the pattern, but that extremely slows the disk read process. For example, if you set Default read attempts to 1, a bad sector will be read 2 times.

Bad Sectors ***dialog box***



If you try to specify the same disk for the recovered files on which the deleted files resided, the Saving a recovered file to the same disk... message will appear. You may continue recovering the files on such disk, but at your own risk.

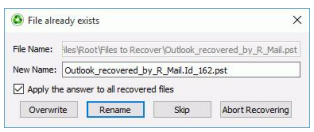

R-UNDELETE 4.9.159562
Using the same drive as file destination is not recommended. Click Cancel to abort or Save to continue at your own risk.
Save
Cancel

> **R-Undelete will recover the selected/marked files/folders to the specified folder**

The Step 5. Recovery status panel will show the results.

If there are file(s) with the same name in the output folder, the File already exists dialog box will appear. You may overwrite, rename, or skip the file, or abort recovery.

File already exists ***dialog box***



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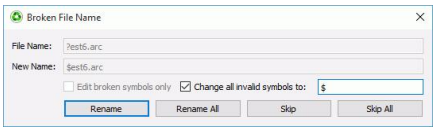
If a file to be recovered appears to have an invalid name, a Broken File Name dialog box will appear. You may correct the name and resume file recovery.

Broken File Name ***dialog box***

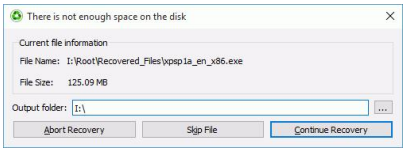


Broken File Name options

File name	Shows the current incorrect file name.
New name	Field for a new file name.
Edit broken symbols only	If this check box is selected, only invalid symbols may be corrected
Change all invalid symbols to	If this check box is selected, all invalid symbols will be changed to the specified symbol
Buttons	
Rename	Click to resume file recovery
Rename All	Click to resume file recovery. All other files will be renamed according to the specified rule.
Skip	Click to skip this file
Skip All	Click to skip all files and stop file recovery

If there is no space available for the recovered files, the There is not enough space on the disk dialog box will appear. You may either select other place to store the files, skip that particular file or abort the recovery process.

There is not enough space on the disk **dialog box**



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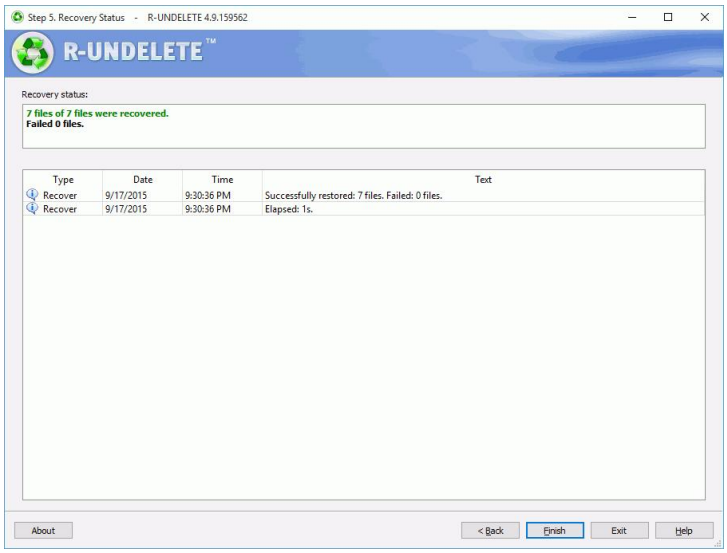
Step 5. Recovery status ***panel***



Click the **Finish** button to return to the Select the disk to recover files from panel or **Exit** to quit **R-Undelete**.

Searching for a File
Finding Previous File Versions
Regular Expressions
Previewing Files

2.1.1 Searching for a File

R-Undelete can find a particular file, if it is difficult to find it manually on the Folders or Files panel. You can also automatically mark/unmark all found files.

Finding and marking files using the Find / Mark ***dialog box***

You may find and mark a single or all the necessary files on the entire disk by using Mark matched files in the Find/ Mark mode option.

To search for a file,

1 **Click the Find button,**

2 **Specify a file to be found and its options on the** Find **dialog box, and click the OK button**
Note that a **File Mask** may be applied.

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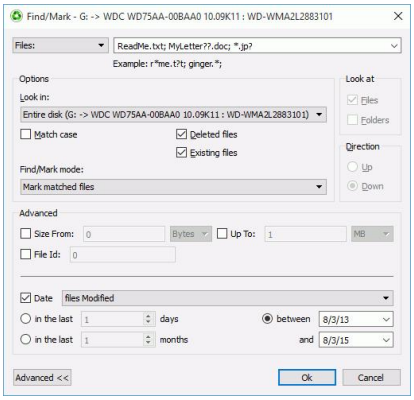
Find / Mark ***dialog box***



Find/Mark options

You may specify how to treat specified strings. Please note that **R-Undelete** stores previously entered search strings.	
Files	If this option is selected, **R-Undelete** treats specified strings as file names. Use ? for one unspecified character and * for an unlimited number of them to specify file masks.
File Extensions	If this option is selected, **R-Undelete** treats specified strings as file extensions
Regular Expressions	If this option is selected, **R-Undelete** treats specified strings as regular expressions
All Files	If this option is selected, **R-Undelete** applies Advanced Options to all files.
Options	
Match case	If this check box is selected, **R-Undelete** makes a case-sensitive search
Look in	Specifies where **R-Undelete** searches for, and marks, files. It can look for them on the Entire disk, From current folder, In the Current folder and subfolders, and in the Current folder only. If From current folder is selected, you may also specify the Direction for the search from the current position in the current folder.
Deleted files	If this check box is selected, **R-Undelete** makes a search among deleted files/folders.
Existing files	If this check box is selected, **R-Undelete** makes a search among existing files/folders.
Find/Mark mode	Specifies what **R-Undelete** does with the found files. It may: Find all matched files. **R-Undelete** searches for all files that match the search criteria. The search results appear on the Find Results panel. Find first matched file. **R-Undelete** stops at the first found file. Mark matched files. **R-Undelete** marks all found files. Unmark matched files. **R-Undelete** unmarks all found files. Please note, that when performing a new find and mark/unmark task, **R-Undelete** does not takes into consideration the previous marked/unmarked state of files. For example, if you first mark all `doc` files, and then all `txt` files, all `doc` files remain marked, too. To unmark them, you should specify `doc` once again and select Unmark matched files.
Look at	
Files	If this check box is selected, **R-Undelete** includes files into a search.
Folders	If this check box is selected, **R-Undelete** includes folders into a search.
Direction	Specifies search direction from the current position. Available only if From current folder

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	is selected in Look in.
Advanced Options	
Size from/up to	Specifies file size limits.
File Id	Specifies File Id that **R-Undelete** assigns to a file.
Date	Specifies file date boundaries. Files may be Modified/Created/Last Accessed.

> **R-Undelete will show/mark the found file(s) on the** Find Results **panel.**

To repeat the search,

* **Click the Find Next or Find Previous buttons**

> **R-Undelete will show the found files on the** Find Results **panel**

Sorting files by their extensions or creation/modification/accessed time

To sort files by their extensions or creation/modification/accessed time,

* **On the Sorted by bar, select**

Existing Structure to sort the files by their existing folders/files structure

Extensions to sort the files by their extensions

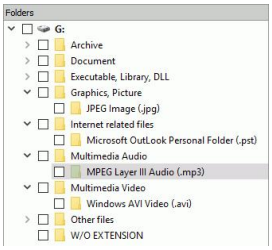
Creation Time to sort the files by their creation time

Modification Time to sort the files by their modification time

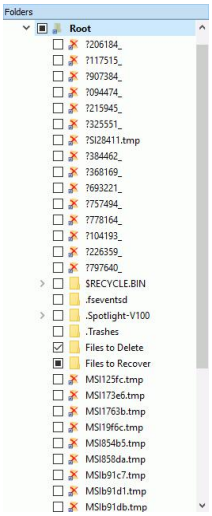
Accessed Time to sort the files by their accessed time

> **Restorer Ultimate will show the sorted files in the** Folders **and** Content **panels, showing a path to each file**

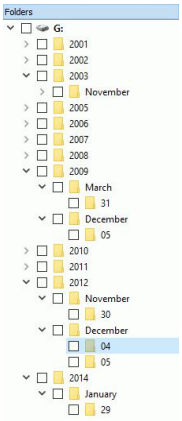
Files sorted by their extensions



Real folders/files structure



Files sorted by their creation/ modification/accessed time



2.1.2 Finding Previous File Versions

R-Undelete can find previous versions of files. It searches for them in the file's current folder and in **Extra Found Files**.

File versions are searched for using file size. If the size of a files is within 10% of the original filesize, the following

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conditions are checked:

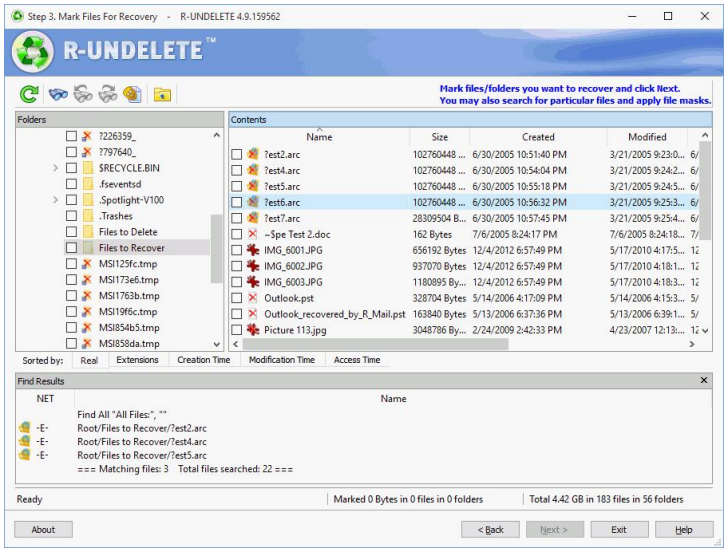
Conditions	Legend
File name	N
File extension	E
Recognized file type	T

To search for previous file versions,

1 **Right-click the file and select Find Previous Versions of the File on the shortcut menu**

* **R-Undelete will show the files in the list:**

File versions



2.1.3 File Masks

R-Undelete shows only those files/folders that match the specified file mask. File mask affects files/folders that are processed by the **Recover** and **Find** commands.

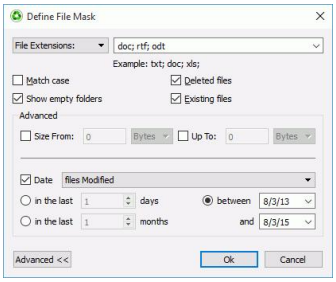
To specify a file mask,

1 **Click the File Mask button, or**

Right-click a folder and select **File Mask** on the shortcut menu

2 **Specify the file mask on the** File mask **dialog box and click the OK button**

Mask **dialog box**



File mask options

You may specify options for All Files, File Extensions, Files, and Regular Expressions

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Match case	If this check box is selected, **R-Undelete** makes a case-sensitive search.
Show empty folders	If this check box is selected, **R-Undelete** will show folders with no files matching the mask.
Deleted files	If this check box is selected, **R-Undelete** makes a search among deleted files/ folders.
Existing files	If this check box is selected, **R-Undelete** makes a search among existing files/ folders.
Advanced Options	
Size from/up to	Specifies file size limits.
Date	Specifies file date boundaries. Files may be Modified/Created/Last Accessed.

> **R-Undelete will show only those files that match the specified file masks**

2.1.4 Regular Expressions

Regular expression is a notation for patterns of text, as opposed to exact strings of characters. The notation uses literal characters and metacharacters. Every character which does not have special meaning in the regular-expression syntax is a literal character and matches an occurrence of that character. For example, letters and numbers are literal characters. A metacharacter is a symbol with special meaning (an operator or delimiter) in the regular-expression syntax.

.	Wildcard: any character
*	Repeat: zero or more occurrences of previous character or class
^	Line position: beginning of line
$	Line position: end of line
[class]	Character class: any character in the set
[^class]	Inverse class: any character not in the set
[x-y]	Range: any characters within the specified range
\x	Escape: literal use of metacharacter x
\<xyz	Word position: beginning of the word
xyz\>	Word position: end of the word

For example, the following regular expression **.*** matches any string of characters, **^a** matches any string beginning with character a.

2.1.5 Previewing Files

R-Undelete has a built-in file previewer that allows you to preview both existing and deleted files. You may use this feature to estimate recovery or a file to be recovered.

To preview a file

1 **Double-click the file on the** Files **panel, or**

Right-click the file on the Files panel and select **Preview** on the shortcut menu

> **R-Undelete will show the content of the file**

If the previewer cannot recognize the format, the file will be opened in the Hex viewer.

List of supported file formats

MS Office files: even without **Microsoft Office** installed
Word documents: doc (Office 97-2003) and docx

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Excel spreadsheets xls (Office 97-2003) and xlsx
PowerPoint presentation ppt (Office 97-2003) and pptx
Adobe Acrobat pdf
Video/Audio files: With proper software and codecs installed in the system
Graphic files:

Format	**Extension**	**Compression**
Adobe Photoshop Document	psd	
Alias Image	pix als alias	
Amiga IFF	iff blk	Rle
Bob Ray-Tracer	bob	
CALS Raster Goup 1	cal cals	
Canon PowerShot	crw	
Casio QV-10/100 Camera	cam	
Chinon ES-1000 digital camera	cmt	
Cloe Ray-tracer	clo	
CompuServe GIF	gif giff	
DKB Ray-tracer	dis	
DPX	dpx	
Deluxe Paint, Electronic Arts	lbm	
Digital F/X	tdim graf	
EPS Interchange Format	epi	
Electric Image	ei eidi	
Encapsulated Postscript (Preview)	eps	
Explore (TDI) & Maya	tdi iff	
Gimp Bitmap	xcf	
Gimp Brush	gbr	
Gimp Icon	ico	
Gimp Pattern	pat	
Image Magick	mif miff	
Imaging Fax	g3n	
Intergraph Format	itg cit rle	
Joint Photographic Experts Group	jpg jpeg jif jfif	
Jeff's Image Format	jif	
Kodak Cineon	cin dpx	
Kodak DC120 Digital Camera	kdc	
Kodak DC25 Camera	k25	
Kodak Photo CD	pcd	
Konica Camera File	kqp	
LucasFilm Format	lff	
MTV Ray-tracer	mtv	
Macintosh Quickdraw/Pict	pic pict pct	

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Mayura Draw	pdx	
Multiple Network Graphics	mng	
OS/2 Bitmap	bmp bga	Rle 4 & 8 bits
Open Image Library Format	oil	
PaintShopPro Browser Cache File	jbf	
PaintShopPro Frame	pfr	
PaintShopPro Image	psp	
PaintShopPro Mask	msk	
PaintShopPro Pattern	pat	
PaintShopPro Picture Tube	tub	
PaintShopPro Texture	tex	
Palm Pilot	pdb	
Pegs	pxa pxs	
Photopaint Image	apx	
Picture Gear Pocket	prc	
Pixar picture file	pic pxr picio pixar	
Pixibox	pxb	
Portable Bitmap	pbm rpbm	
Portable Document Format	pdf	
Portable Greyscale	pgm rpgm	
Portable Image	pnm rpnm	
Portable Network Graphics	png	
Portable Pixmap	ppm rppm	
Postscript	ps	
Psion Series 3	pic	
Psion Series 5	mbm	
Qrt Ray-tracer	qrt	
Quantel VPB	vpb	
Quicktime Picture	qtif qti	
Rayshade	pic	
Ricoh Digital Camera	j6i	
SciTex Continuous Tone	sct sc	
Seattle Film Works	sfw	
Seattle Film Works multi-image	pwp	
Sega SJ-1 DIGIO	sj1	
Silicon Graphics RGB	rgb bw iris sgi	Rle
Softimage bitmap	pic si	Rle
Sony DSC-F1 Cyber-shot	pmp	
Sony Playstation TIM PSX	tim	
Sun Icon/Cursor	icon cursor pr	

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Sun Raster Images	ras rast sun sr scr rs	
Sun TAAC file format	iff vff suniff taac	
Synthetic Universe	synu syn	
TIFF Revision 6	tif tim tiff	Rle LZW LZW + Prediction
TrueVision Targa	tga pix bpx vda icb vst	Rle
Utah Raster image	Rle	
Vista	vst	
Vivid Ray-tracer	img	
Wavefront Raster file	rla rlb	
Webshots	wbc wbp wbz	
Winfax	fxs fxo	
Windows & Aldus Metafile	wmf	
Windows Bitmap	bmp rle rl4 rl8 sys	Rle 4 & 8 bits
Windows Clipboard	clp	
Windows Cursor	cur	
Windows DIB	dib	
Windows Enhanced Metafile	emf	
Windows Icon	ico	
Wireless Bitmap (level 0)	wbmp wbm wap	
X11 BitMap	xbm bm	
X11 PixMap	xpm pm	
XV Visual Schnauzer	p7	
Zsoft Multi-page Paintbrush	dcx	
Zsoft Publisher's Paintbrush	pcx pcc dcx	Rle

2.1.6 Detailed Scan

If you did not find your lost file through the fast search for lost files, you need to perform the exhaustive search for them. Sometimes, this procedure is called "Disk scan". During this process, **R-Undelete** completely analyzes data structure on the logical disk and may find deleted files that do not appear file enumeration.

Attention: Performing an exhaustive search for files on large objects may be a very lengthy process!

Note: If you try to start **R-Undelete** under an account without administrative rights, you will have to enter an administrative password on the User Account Control dialog box..

To perform a detailed scan for files on a logical disk,

1 **Select the logical disk on the R-Undelete Step1.** Select disk **panel and click the Next button,** or double-click the disk.

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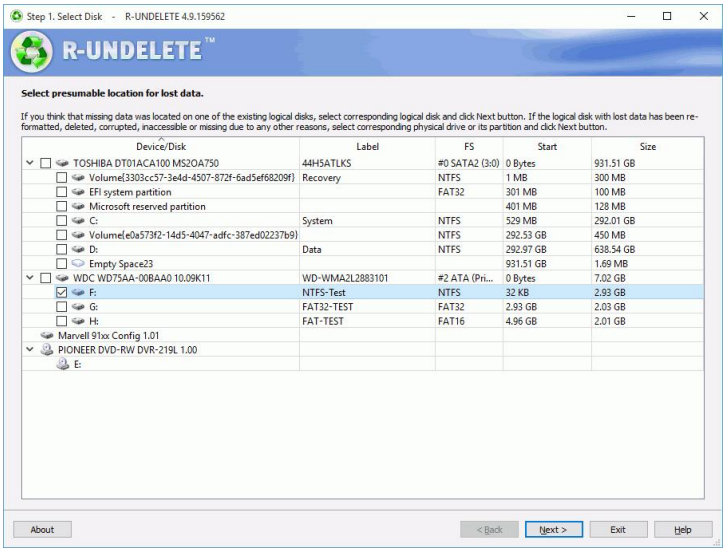
Step1. Select disk ***panel***

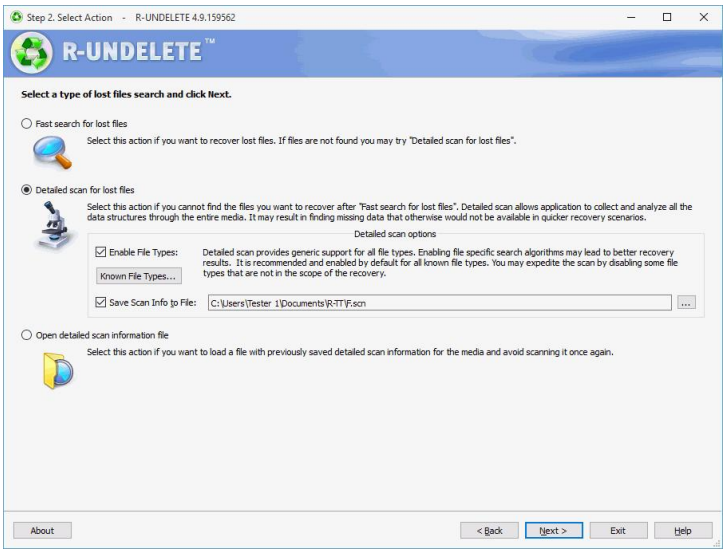


You may start performing exhaustive search for files on a logical disk with **R-Undelete** directly from Windows Explorer. Right-click the disk in **Windows Explorer** and select **Perform Detailed Scan on the disk with R-Undelete** on the shortcut menu.

If there is bad S.M.A.R.T. data for the hard drive, **R-Undelete** will show a S.M.A.R.T. warning describing the situation. You may decide what to do with the drive.

2 Select Detailed Scan on the Step 2. Select action **panel and click the Next button**

Step 2. Select action ***panel***


Step 2. Select Action - R-UNDELETE 4.9.159562
R-UNDELETE
Select a type of lost files search and click Next.
Fast search for lost files
Select this action if you want to recover lost files. If files are not found you may try "Detailed scan for lost files".
Detailed scan for lost files
Select this action if you cannot find the files you want to recover after "Fast search for lost files". Detailed scan allows application to collect and analyze all the data structures through the entire media. It may result in finding missing data that otherwise would not be available in quicker recovery scenarios.
Detailed scan options
Enable File Types:
Detailed scan provides generic support for all file types. Enabling file specific search algorithms may lead to better recovery results. It is recommended and enabled by default for all known file types. You may expedite the scan by disabling some file types that are not in the scope of the recovery.
Known File Types...
Save Scan Info to File:
C:\Users\Tester 1\Documents\R-TT\F.scn
Open detailed scan information file
Select this action if you want to load a file with previously saved detailed scan information for the media and avoid scanning it once again.
About
< Back
Next >
Exit
Help

Known File Types:

While performing exhaustive search, **R-Undelete** can recognize the data's particular file type. Using such information, **R-Undelete** can obtain more information about data/file structure on the object being searched. By default, **R-Undelete** tries to recognize all supported file types, greatly increasing time required for the search. You may reduce it by selecting only those file types that you need. Click the **Known File Types...** button on the Data Recovery Action panel and select the required file types on the File Types dialog box.

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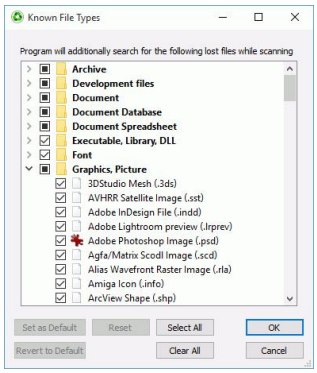
File Types **dialog box**



List of known file types

* By default, files of this type are not selected. If necessary, select them manually			
Document			
AbiWord Document: `.abw`	Adobe PDF document: `.pdf`	Final Draft Document: `.fdr`	FrameMaker Document: `.fm`
Garmin MapSource data: `.mps`	GNU Info Document: `.info`	HTML Document: `.html`	Lotus AMI Pro Document: `.sam`
Lotus Organizer Report: `.rep`	Lotus Word Pro Document: `.lwp`	Microsoft Money Data: `.mny`	Microsoft Office Open XML Document *
Microsoft OneNote section file: `.one`	Microsoft Pocket Streets Map File: `.mps`	Microsoft PowerPoint 2007 XML Document*: `.pptx`	Microsoft PowerPoint Document*: `.ppt`
Microsoft Reader eBook: `.lit`	Microsoft Reader eBook annotations: `.ebo`	Microsoft Word 2007 XML Document*: `.docx`	Microsoft Word Document*: `.doc`
Microsoft Word2 Document: `.doc`	Microsoft WordPad Document: `.wri`	OLE Storage	OpenDocument Document
PostScript document:`*.ps`	QuickBooks Backup File: *.qbb	QuickBooks Primary Data File: `*.qbw`	Quicken Data: `*.qdf`
Rich Text Document: `.rtf`	TEX Document: `.tex`	Text Document: `.txt`	TurboTax return file:.`tax`
Unicode Document: `.txt`	Word for Macintosh Document: `.mcw`	WordPerfect Document: `.doc`	XML Document: `.xml`
Document: Spreadsheet			
Lotus Spreadsheet: `.wks`	Lotus3 Spreadsheet: `.wk3`	Microsoft Excel 2007 XML Document*: `.xlsx`	Microsoft Excel Document*: `.xls`
Microsoft Excel2 Spreadsheet: `.xls`	Microsoft Excel3/4 Spreadsheet: `.xls`	Quattro Pro Spreadsheet: `.wq1`	
Document: Database			
Data Interchange Format file: `.dif`	dBase III Database: `.dbf`	Microsoft Access 2007 Database: `.accdb`	Microsoft Access 2007 XML

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			Document: .accdt
Microsoft Access Database: .mdb	Microsoft Linker Database: .lk	Microsoft Program Database: .pdb	Microsoft SQL Database: .mdf
Microsoft SQL Log: .ldf	MySQL Database: .myi	Omnis Studio Database: .df1	Omnis Studio Library: .lbs
Internet-related files			
Compiled HTML file: .chm	Internet shortcut: .url	Microsoft OutLook Personal Folder: .pst	Microsoft Outlook/ Inbox offline folder: .ost
Mozilla Firefox browser extension: .xpi	Mozilla Mail Summary file: .msf	Outlook Express Messages: .dbx	The Bat! Address book: .abd
The Bat! Message Base: .tbb	The Bat! Message Index: .tbi	Windows Address Book: .wab	XML document (Unicode): .xml
Font			
Adobe PostScript Font: .pfb	Adobe Printer Font: .pfm	BDF Unix font	BGI font: .chr
CPI DOS font: .cpi	MyTest Font: .mtf	TrueType Font: .ttf	Windows System Font: .fon
Graphics/Picture			
3D XML file: .3dxml	3DStudio Mesh: .3ds	Adobe InDesign File: .indd	Adobe Photoshop Image: .psd
Agfa/Matrix Scodl Image: .scd	Alias Wavefront Raster Image: .rla	ArcView Shape:. shp	AutoCAD Binary Image: .dxf
AutoCAD Drawing: .dwg	AutoCAD Image: .dxf	Autodesc Animator Image: .pic	Autodesc Animator Pro color map: .col
Autodesc Animator Pro Image: .pic	Autologic Image: .gm	AVHRR Satellite Image: .sst	Bentley MicroStation CAD Drawing: .dgn
BMF Image: .bmf	Canon RAW graphics file: .crw	Canon RAW graphics file*: .cr2	Canon RAW graphics file: .crw
ColoRIX Image: .rix	CompuServe GIF Image: .gif	ComputerEyes Raw Image: .ce1	Continous Edge Graphic Image: .ceg
Corel Texture Image: .tex	CorelDraw CMX Image: .cmx	CorelDraw Image: .cdr	Cubicomp Picture Maker Image
Dr. Halo palette: .pal	Enhanced MetaFile Image: .emf	Epson Stylus Image: .prn	Erdas LAN/GIS Image: .lan
Fractal Image Format: .fif	Freehand (MX) Database: .fh10	GEM Raster Image: .img	GEM VDI Image: .gdi
GOES Satellite Image: .goe	Graphics Workshop for Windows Thumbnail: .thn	Gridded Binary Image: .grb	Hitachi Raster Image: .hrf
Hotspot Image: .shg	HP Command Language Image: .pcl	HP Raster Image: .rtl	HSI JPEG Image: .hsi

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IBM Picture Maker Image: `*.pic`	iPhoto Image: `.attr`	Jovian Logic Image: `.vi`	JPEG 2000: `.jp2`
JPEG Digital Camera*: `.jpg`	JPEG Image: `.jpg`	Kodak PhotoCD Image: `.pcd`	LBM/IFF Image: `.lbm`
Lightwave Object: `.lwo`	Lotus PIC Image: `.pic`	Macintosh Paint Image: `.mac`	Macintosh PICT Image: `.pct`
Microsoft Paint Image: `.msp`	Minolta RAW image: `.mrw`	Nikon RAW image*: `.nef`	Olympus RAW image: `.orf`
PaintShop Pro Image: `.psp`	PaperPort Image: `.max`	PBM Image: `.pbm`	PGM Image: `.pgm`
Pictor PC Paint Image: `.pic`	PIX Image: `.pix`	PM Image: `.pm`	PNG Image: `.png`
PPM Image: `.ppm`	Print Shop Image: `.pds`	QuarkXpress Database: `.qxp`	QuarkXPress file: `.qxd`
Quick Link II fax Image: `.qfx`	QuickDraw 3D Metafile: `.3dmf`	RenderMan Image: `.rib`	SGI Image: `.sgi`
Sigma RAW image: `.x3f`	Sketch Image: `.sk`	SmartDraw file: `.sdr`	SmartDraw template: `.sdt`
Sony RAW image: `.arw`	STAD Image: `.pac`	Sun Raster Image: `.sun`	SymbianOS Image: `.mbm`
Tagged Image Format File: `.tif`	TI Image: `.92i`	TrueVision Image: `.tga`	Utah Raster Toolkit Image: `.rle`
VITec Image: `.vit`	Windows Animated cursor: `.ani`	Windows Bitmap Image: `.bmp`	Windows cursor: `.cur`
Windows Fax Cover Image: `.cpe`	Windows icon: `.ico`	Windows MetaFile Image: `.wmf`	WordPerfect Graphics Image: `.wpg`
X PixMap Image: `.xpm`	X Window Dump Image: `.xwd`	Xara Drawing: `.xar`	ZSoft PCX Image: `.pcx`
Multimedia: Audio Files			
Advanced Streaming Format file: `.asf`	AIFF Sound: `.aif`	Amusic tracker: `.amd`	aPac Audio: `.apc`
AudioCD file: `.cda`	AVR Sound: `.avr`	CMF Music: `.cmf`	Creative Voice File: `.voc`
DiamondWare Sound: `.dwd`	Digital Speech File: `.dss`	Digital Voice File: `.dvf`	EA ASF/MUS Audio: `.asf`
Extended M3U playlist: `.m3u`	FLAC Audio	La Lossless Audio: `.la`	Liquid Audio: `.la1`
MIDI Instrument definition: `.idf`	MIDI Music: `.mid`	MIDI stream: `.mds`	Monkeys Audio: `.ape`
MPEG Layer I Audio: `.mpg`	MPEG Layer II Audio*: `.mp2`	MPEG Layer III Audio*: `.mp3`	MUS Music: `.mus`
Musepack Audio: `.mpc`	Next/Sun Sound: `.au`	Ogg Vorbis Audio: `.ogg`	OptimFROG

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			Audio: .ofr
RIFF MIDI Music: .rmi	RK Audio Sound: .rka	Sierra AUD Sound: .aud	Sony OpenMG Audio: .oma
Super NES Audio: .spc	TTA Audio: .tta	VQF Sound: .vqf	WavPack Audio: .wv
Westwood AUD Sound: .aud	Windows Audio Compression Manager driver: .acm	Windows Media Audio: .wma	Windows WAVE Sound: .wav
X-MIDI Music: .xmi	ZyXEL Sound: .zyx		
Multimedia: Video Files			
3GPP multimedia audio/ video: .3gp	3GPP2 multimedia audio/video: .3g2	4X Movie Video: .4xm	Adobe Filmstrip Animation: .fsf
AMV Video: .amv	ANIM Animation: .cel	Autodesk Animator: .fli	BCS Video: .bcs
BINK Video: .bik	DeluxePaint Animation: .anm	Director Video: .dcr	DriveCam Video: .dce
DVM Video: .dvm	Eyemail Video: .eye	Flash Video: .flv	Google Video: .gvi
Intel DVI Video: .dvi	Intel Indeo Video File: .ivf	Interplay MVE Video: .mve	Lotus ScreenCam Video: .scm
LZA Animation: .lza	MPEG Video: .mpg	Nancy Codec Video: .noa	NEOchrome Animation: .ani
Nullsoft Video: .nsv	NuppelVideo (MythTV) Video: .nuv	QuickTime Video: .mov	QV-10 Video: .cam
RPL Video: .rpl	Sega FILM/CPK Video: .cpk	SGI movie format: .mv	Shockwave Video: .swf
Smacker Video: .smk	SMJPEG Video: .mjpg	Sony Movie Player Video: .mqv	VideoCD MPEG: .dat
VideoCD Video: .vcd	Vivo streaming Video: .viv	VOB video files: .vob	VP6 encoded Video: .vp6
Windows AVI Video: .avi	Windows Media Video: .wmv		
Multimedia Files			
Material Exchange File: .mxf	MP4 file: .mp4	Real Networks audio/ video: .rm	RIFF Multimedia File
Archive Files			
7-Zip archive: .7z	ACE archive: .ace	AIN archive: .ain	ARJ archive: .arj
ARX archive: .arx	Aladdin Systems StuffIt archive: .sit	BAG archive: .bag	BIX archive: .bix
BOA archive: .b58	BZip2 archive: .bz2	BlackHole archive: .bh	Blink archive: .bli
CPIO archive: .cpio	CRUSH archive	ChArc archive: .chz	Compress archive: .z
FOXSQZ archive: .sqz	GZip archive: .gz	HA archive *: .ha	HAP archive: .hap
HPACK archive: .hpk	Hyper archive: .hyp	InstallShield Cabinet archive: .cab	InstallShield Data archive: .z

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InstallShield archive	JAM archive: `.jam`	JAR archive: `.jar`	JRC archive: `.jrc`
LHA/LZARK archive: `*.lzh`	LIMIT archive: `*.lim`	LZA archive: `*.lza`	LZOParchive: `.lzo`
LZSH archive	LZX archive: `.lzx`	Microsoft Cabinet archive: `.cab`	Microsoft Compress 5 archive
Microsoft Compress 6 archive	PAKLEO archive: `.pll`	Pack archive *	QFC archive: `.qfc`
Quantum archive *: `.ark`	Quark archive	RAR archive: `.rar`	RPM archive: `.rpm`
ReSOF archive: .sof	SAR archive: `.sar`	SBC archive: `.sbc`	SCO archive *
SQZ archive: `.sqz`	SZip archive	StuffIt archive: `.sit`	TAR archive: `.tar`
UFA archive: `.ufa`	UHArc archive: `.uha`	UltraCompressor 2 archive: `.uc2`	UltraCrypt 2 archive: `.ue2`
WIN-Freeze archive*: `.ice`	WRAptor archive: `.wra`	WinImp archive: `.imp`	YAC archive: `.yc`
YBS archive: `.ybs`	ZIP archive: `.zip`	ZOO archive: `.zoo`	ZZip archive: `.zz`
Apple Safari Web Archive: `.webarchive`	Microsoft Internet Explorer Web Archive: `.mht`	R-Drive Image Archive: `.arc`	R-Drive Image V1 Archive: `.arc`
WinImage Archive: `*.imz`			
Executable/Library/DLL			
DOS Style Executable: `.exe`	ELF Executable (UNIX)	ELF Library (UNIX)	ELF Module (UNIX)
Java Bytecode: `.class`	Novell NetWare executable: `.nlm`	RDOFF executable	Win32 DLL*: `.dll`
Win32 Executable*: `.exe`	Windows OCX File: `.ocx`		
Development files			
Borland Delphi 6 Library: `.dcu`	Borland Turbo Pascal compiled Unit: `.tpu`	COM Type Library: `.tlb`	Delphi 7 Compiled Unit: `.dcu`
Library: `.lib`	Microsoft .NET XML Resource template: `.resx`	Microsoft ClassWizard file: `.clw`	Microsoft Linker database
Microsoft Precompiled header: `.pch`	Microsoft Visual C++ Database: `.mdp`	Microsoft Visual Studio Database: `.dsp`	Microsoft Visual Studio Solution: `.sln`
Microsoft Program database	Microsoft Visual C++ project		Microsoft Visual Studio workspace: `.dsw`
OMF Object library: `.lib`	VisualBasic Database: `.vbp`	Windows Compiled resource (16bit) *: `.res`	Windows Compiled resource (32bit): `.res`
Other file types			
ABBYY Lingvo dictionary: `.lsd`	File Crypt file: `.rzx`	Kaspersky Anti-virus data base: `.avc`	NOD32 Antivirus Update file: `.nup`

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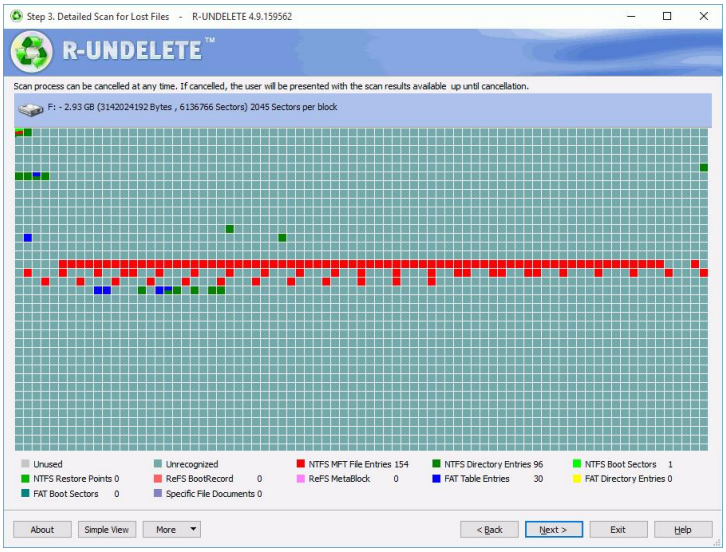
OziExplorer Map data:.map	RegEdit file: .reg	RegEdit file (UNICODE): .reg	Windows Backup File: .bkf
Windows Clipboard file: .clp	Windows Color Profile: .icm	Windows Minidump	Windows National locale: .nls
Windows Password file: .pwl	Windows Policy file: .pol	Windows Registry file: .dat	Windows Registry hive: .hiv
Windows shortcut: .lnk	WinHelp: .hlp	WinHelp Contents: .cnt	

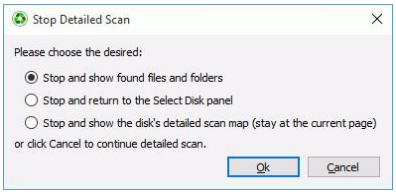
Note: Using scan for Known File Types, **R-Undelete** can successfully recover only un-fragmented files.
Save Scan Info to Files: If this checkbox is selected, **R-Undelete** will save scan information to a specified file. Later this file may be opened. Please note, that this option does not save actual disk data, only information on disk data structure gathered during disk scan.

> **R-Undelete start detailed scan showing its progress and found objects**

Detailed scan in progress **panel**


Step 3. Detailed Scan for Lost Files - R-UNDELETE 4.9.159562
R-UNDELETE
Scan process can be cancelled at any time. If cancelled, the user will be presented with the scan results available up until cancellation.
F: - 2.93 GB (3142024192 Bytes , 6136766 Sectors) 2045 Sectors per block
Unused
Unrecognized
NTFS MFT File Entries 154
NTFS Directory Entries 96
NTFS Boot Sectors 1
NTFS Restore Points 0
ReFS BootRecord 0
ReFS MetaBlock 0
FAT Table Entries 30
FAT Directory Entries 0
FAT Boot Sectors 0
Specific File Documents 0
About
Simple View
More
< Back
Next >
Exit
Help

If you click the **Stop** button and select the action you want to make on the Stop message. You may stop the exhaustive search and go back to the Select the disk to recover files from panel, continue searching, show already found files, or remain on the Detailed file search results panel.


Stop Detailed Scan
Please choose the desired:
Stop and show found files and folders
Stop and return to the Select Disk panel
Stop and show the disk's detailed scan map (stay at the current page)
or click Cancel to continue detailed scan.
Ok
Cancel

When the search is through, **R-Undelete** will show the Files / Folders panel will appear. You may make data recovery based on the scan result. If ***Known File Types***: are enabled, **R-Undelete** shows found such files on the Files / Folders panel as **Extra Found Files**.

Extra Found Files.

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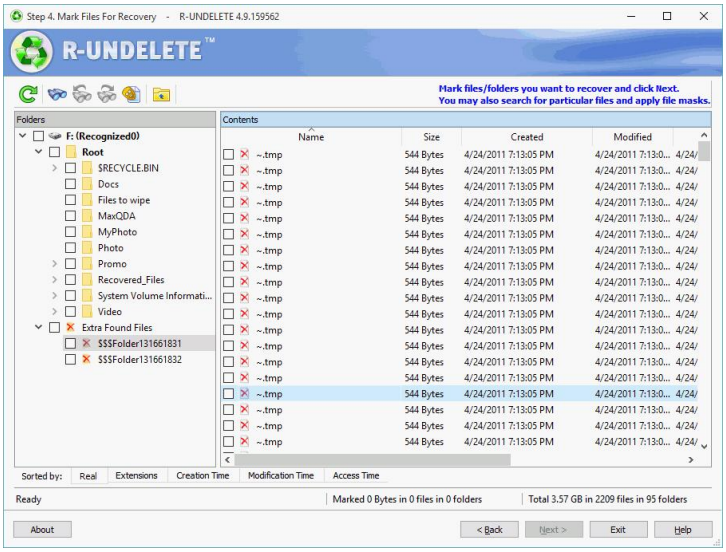
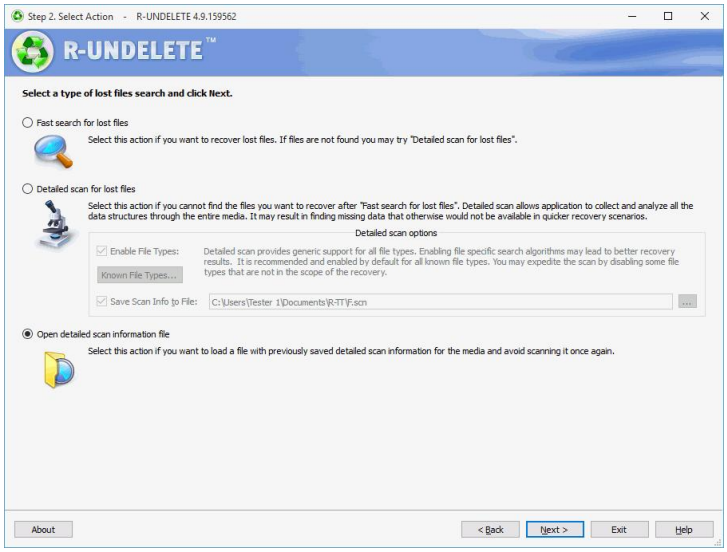


Loading Scan Information

To load scan information on the disk,

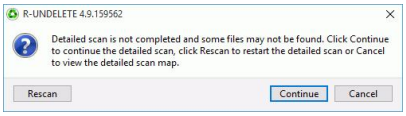
1 **Select Open detailed scan information file on the the logical disk on the R-Undelete** Step 2. Select action **panel and click the Next button,**

Step 2. Select action ***panel*** **panel**


Step 2. Select Action - R-UNDELETE 4.9.159562
R-UNDELETE
Select a type of lost files search and click Next.
Fast search for lost files
Select this action if you want to recover lost files. If files are not found you may try "Detailed scan for lost files".
Detailed scan for lost files
Select this action if you cannot find the files you want to recover after "Fast search for lost files". Detailed scan allows application to collect and analyze all the data structures through the entire media. It may result in finding missing data that otherwise would not be available in quicker recovery scenarios.
Detailed scan options
Enable File Types:
Detailed scan provides generic support for all file types. Enabling file specific search algorithms may lead to better recovery results. It is recommended and enabled by default for all known file types. You may expedite the scan by disabling some file types that are not in the scope of the recovery.
Known File Types...
Save Scan Info to File:
C:\Users\Tester 1\Documents\R-TT\F.scn
Open detailed scan information file
Select this action if you want to load a file with previously saved detailed scan information for the media and avoid scanning it once again.
About
< Back
Next >
Exit
Help

2 **Select the required file with the scan info.**

If the previous scan is not completed, the Detailed scan is not completed... message will appear. You may either continue the scan or process the existing scan information.


R-UNDELETE 4.9.159562
Detailed scan is not completed and some files may not be found. Click Continue to continue the detailed scan, click Rescan to restart the detailed scan or Cancel to view the detailed scan map.
Rescan
Continue
Cancel

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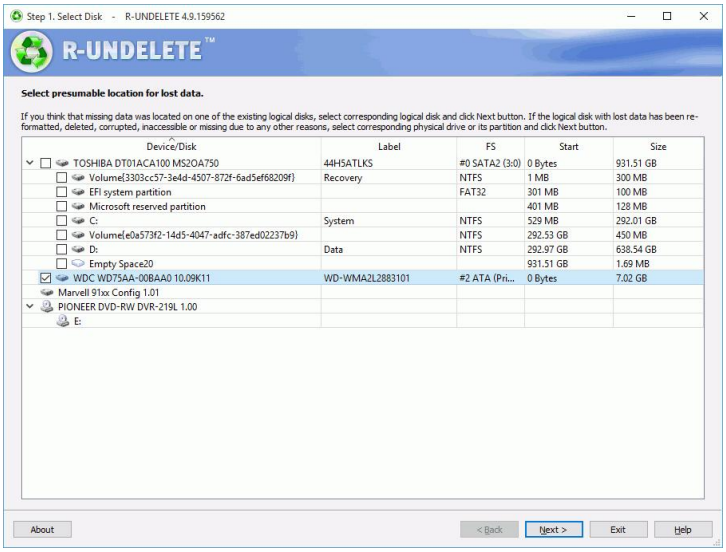
2.2 Recover Lost Files from Deleted/Corrupted Logical Disks/Partitions

To recover deleted files from a deleted logical disk,

1 **Select the hard drive where the deleted logical disk resided on the R-Undelete** Select the disk to recover files from **panel and click the Next button**

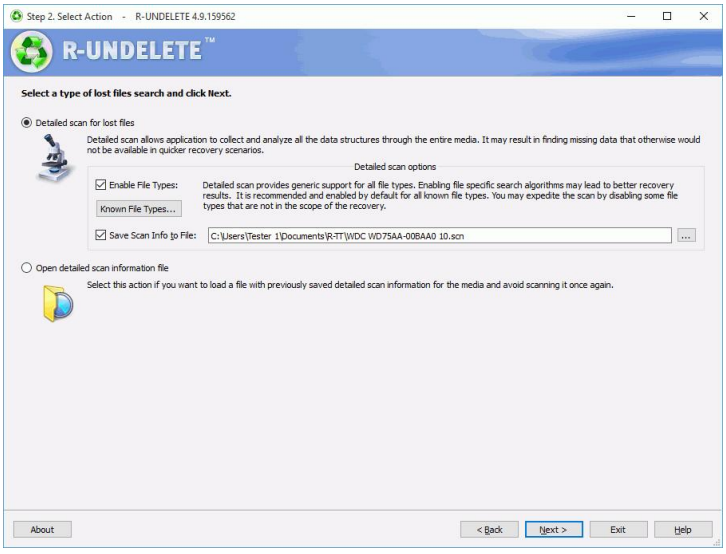
Step1. Select disk ***panel***


Step 1. Select Disk - R-UNDELETE 4.9.159562
R-UNDELETE
Select presumable location for lost data.
If you think that missing data was located on one of the existing logical disks, select corresponding logical disk and click Next button. If the logical disk with lost data has been re-formatted, deleted, corrupted, inaccessible or missing due to any other reasons, select corresponding physical drive or its partition and click Next button.
Device/Disk
Label
FS
Start
Size
TOSHIBA DT01ACA100 MS2OA750 44H5ATLKS #0 SATA2 (3:0) 0 Bytes 931.51 GB
Volume{3303cc57-3e4d-4507-872f-6ad5ef68209f} Recovery NTFS 1 MB 300 MB
EFI system partition FAT32 301 MB 100 MB
Microsoft reserved partition 401 MB 128 MB
C: System NTFS 529 MB 292.01 GB
Volume{e0a573f2-14d5-4047-adfc-387ed02237b9} NTFS 292.53 GB 450 MB
D: Data NTFS 292.97 GB 638.54 GB
Empty Space20 931.51 GB 1.69 MB
WDC WD75AA-00BAA0 10.09K11 WD-WMA2L2883101 #2 ATA (Pri... 0 Bytes 7.02 GB
Marvell 91xx Config 1.01
PIONEER DVD-RW DVR-219L 1.00
E:
About
< Back
Next >
Exit
Help

If there is bad S.M.A.R.T. data for the hard drive, **R-Undelete** will show a S.M.A.R.T. warning describing the situation. You may decide what to do with the drive.

2 **Select options on the** Step 2. Confirm action **panel and click the Next button**

Step 2. Confirm action ***panel***


Step 2. Select Action - R-UNDELETE 4.9.159562
R-UNDELETE
Select a type of lost files search and click Next.
Detailed scan for lost files
Detailed scan allows application to collect and analyze all the data structures through the entire media. It may result in finding missing data that otherwise would not be available in quicker recovery scenarios.
Detailed scan options
Enable File Types:
Known File Types...
Detailed scan provides generic support for all file types. Enabling file specific search algorithms may lead to better recovery results. It is recommended and enabled by default for all known file types. You may expedite the scan by disabling some file types that are not in the scope of the recovery.
Save Scan Info to File:
C:\Users\Tester 1\Documents\R-TT\WDC WD75AA-00BAA0 10.scn
Open detailed scan information file
Select this action if you want to load a file with previously saved detailed scan information for the media and avoid scanning it once again.
About
< Back
Next >
Exit
Help

You may enable/disable search for Known File Types.

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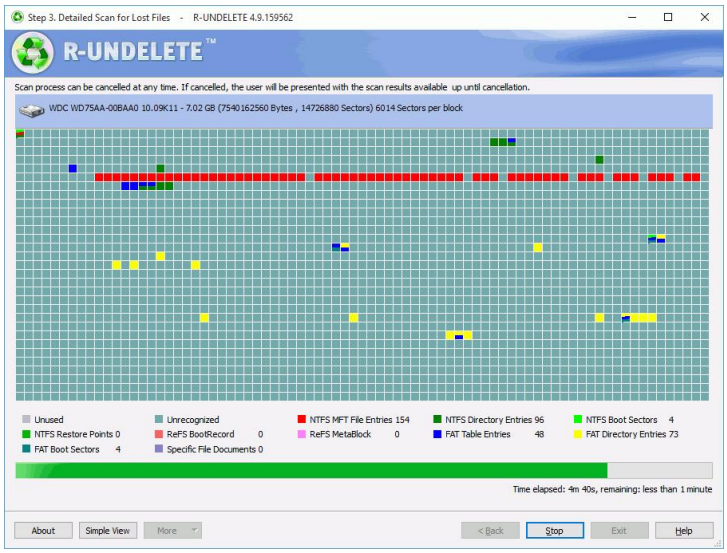
> **R-Undelete starts analyzing the hard drive, and its** Detailed file search in progress **panel will show search progress and found objects**

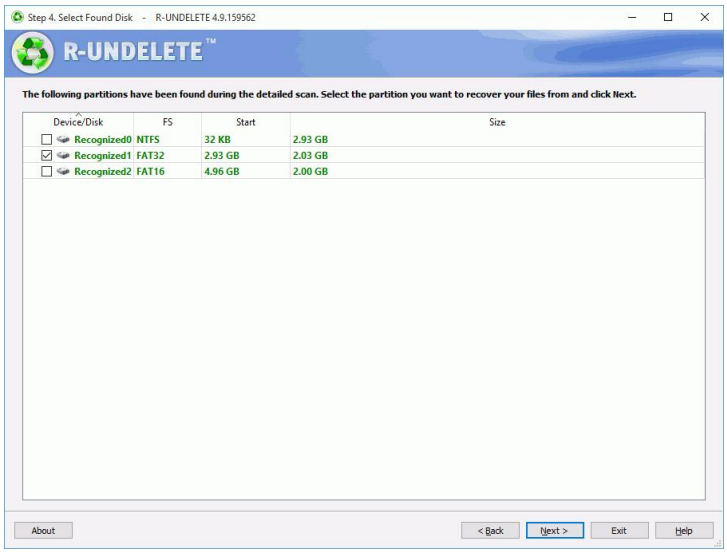
Detailed file search in progress ***panel***


Step 3. Detailed Scan for Lost Files - R-UNDELETE 4.9.159562
R-UNDELETE
Scan process can be cancelled at any time. If cancelled, the user will be presented with the scan results available up until cancellation.
WDC WD75AA-00BAA0 10.09K11 - 7.02 GB (7540162560 Bytes , 14726880 Sectors) 6014 Sectors per block
Unused
Unrecognized
NTFS MFT File Entries 154
NTFS Directory Entries 96
NTFS Boot Sectors 4
NTFS Restore Points 0
ReFS BootRecord 0
ReFS MetaBlock 0
FAT Table Entries 48
FAT Directory Entries 73
FAT Boot Sectors 4
Specific File Documents 0
Time elapsed: 4m 40s, remaining: less than 1 minute
About
Simple View
More
< Back
Stop
Exit
Help

If you click the **Stop** button and select the action you want to make on the Stop message. You may stop the exhaustive search and go back to the Select the disk to recover files from panel, continue searching, show already found files, or remain on the Detailed file search results panel.

3 Select the deleted/corrupted logical disk/partition where the lost files resided on the Step 3. Select found disk **panel nd click the Next button**

Step 3. Select found disk ***panel***


Step 4. Select Found Disk - R-UNDELETE 4.9.159562
R-UNDELETE
The following partitions have been found during the detailed scan. Select the partition you want to recover your files from and click Next.
Device/Disk
FS
Start
Size
Recognized0 NTFS 32 KB 2.93 GB
Recognized1 FAT32 2.93 GB 2.03 GB
Recognized2 FAT16 4.96 GB 2.00 GB
About
< Back
Next >
Exit
Help

R-Undelete shows found objects in different colors depending on which elements of the partition have been found.

Recognized6 (F:)	An existing logical disk or partition
Recognized2	Both boot records and file entries are found for this partition
Recognized1	Only file entries are found for this partition

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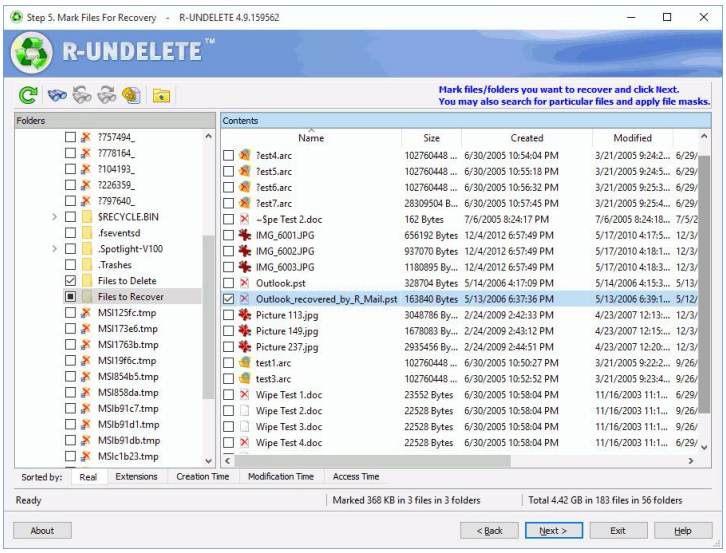
Recognized3	Only boot records are found for this partition

4 **Perform all necessary lost file recovery operations starting from the** Step 4. Select files for recovery **panel the same way as if the files were on an existing logical disk**

Step 4. Select files for recovery ***panel***



See Recovering lost files from an existing logical disk for the detailed instructions on file recovery.

III Disk Image

An *image* is an exact, byte by byte, copy of any object on the Step1. Select disk panel. When created, images can be processed like their original objects.

Images are very useful if there is a risk of total data loss due to hardware malfunction. If bad blocks are constantly appearing on a hard drive, you must immediately create an image of this drive. All data search and recovery can be done from this image.

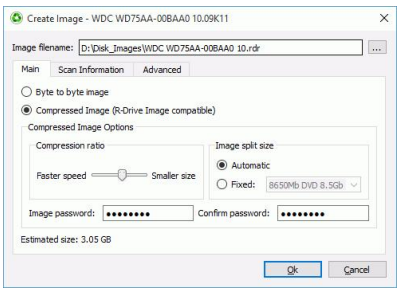
To create an *image*,

1 **Right-click the disk on the R-Undelete** Step1. Select disk **panel and select Create Image File on the shortcut menu**

2 **Specify image options, a file name, and destination for the *image* on the** Create Image **dialog box**

Note: To store an image file, you need a free space equal to at least the object size.

Create Image **File dialog box**



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Create Image **File dialog box**

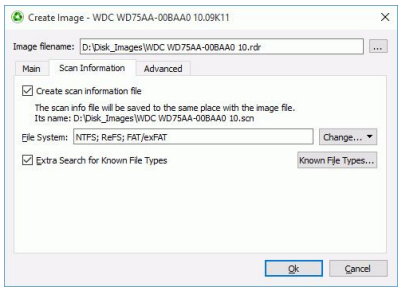
Create Image - WDC WD75AA-00BAA0 10.09K11
Image filename: D:\Disk_Images\WDC WD75AA-00BAA0 10.rdr
Main
Scan Information
Advanced
Create scan information file
The scan info file will be saved to the same place with the image file.
Its name: D:\Disk_Images\WDC WD75AA-00BAA0 10.scn
File System: NTFS; ReFS; FAT/exFAT
Change...
Extra Search for Known File Types
Known File Types...
Ok
Cancel

Image Options

Image name	Specifies the name and path for the image file
Byte to byte image	If this option is selected, **R-Undelete** will create a simple exact copy of the object. This image format is compatible with the previous versions of **R-Undelete**.
Compressed image (R-Drive Image compatible)	If this option is selected, **R-Undelete** will create an image file which can be compressed, split into several parts, and password-protected. This image file is fully compatible with the images created by **R-Drive Image**, but incompatible with the previous versions of **R-Undelete**.
Image compression ratio	You may compress the data in the image to save space. Active only if the Compressed image (R-Drive Image compatible) is selected.
Estimated size	Shows the estimated size of the image file. An actual image size depends on how much empty space is on the selected partition and what file types are there. Active only if the Compressed image (R-Drive Image compatible) is selected.
Image split size	You may set this option to Automatic and let Windows decide how to split the image file. This mostly depends on the file system on the destination disk. You may also either explicitly specify the split size, or choose a preset for various devices with removable storage. Select Fixed size for that. Active only if the Compressed image (R-Drive Image compatible) is selected.
Password	You may protect your image file with a password. **Note:** This feature provides a relatively moderate protection against conventional unauthorized access. Active only if the Compressed image (R-Drive Image compatible) is selected.
Create scan information file	If this option is selected, **R-Undelete** will perform disk scan simultaneously with image creation. See the **Detailed Scan** help page to learn scan options.

You may also specify how to process files with bad sectors. You may specify the number of attempts to read the bad sectors and a pattern to fill the bad block.

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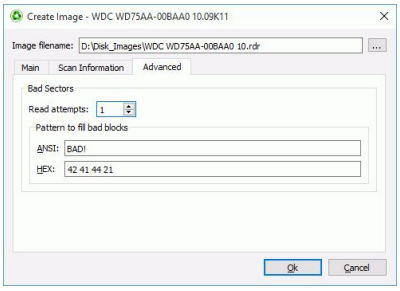
Create Image **File dialog box**



> **R-Undelete will start creating the image**

To process an already created *Image*, the image file should be opened.

To open an image

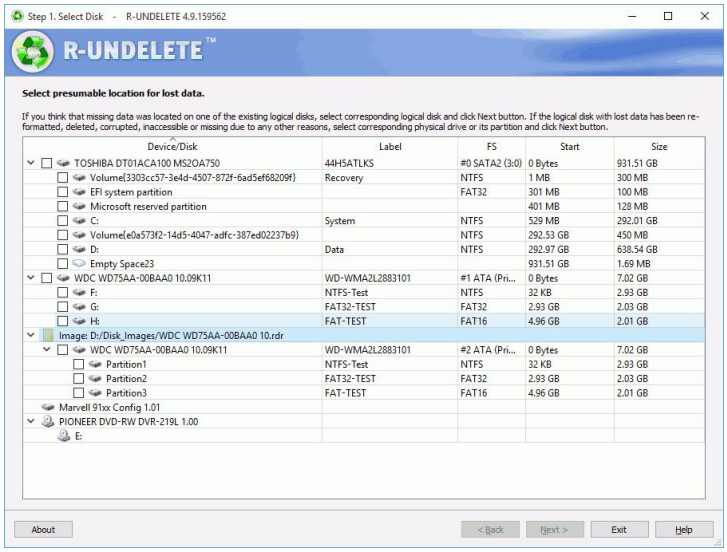
1 **Right-click any object on the** Step1. Select disk **panel and select Open Image File on the shortcut menu**

2 **Select the required image file**

> **An *Image* object will appear on the** Step1. Select disk **panel**

You may perform all data search and recovery from this image as it were a regular drive/disk object.

Step1. Select disk ***panel***.



To remove an image from the list,

* **Right-click the image and select Remove Image From List on the shortcut menu**

> **The image will disappear from the** Step1. Select disk **panel**

Note: When you remove an image from the Step1. Select disk panel, the original image file will remain in its place.

IV Hexadecimal Viewer

If the previewer cannot recognize the format of the file to be previewed, it will open the file in the **Text/ Hexadecimal viewer.**

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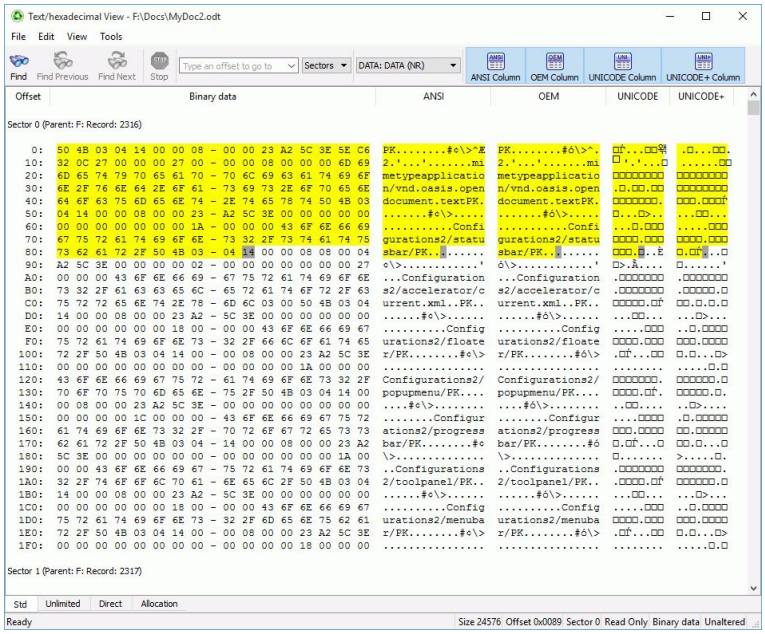
Viewer ***panel***



There are up to four tabs showing the data in different representations. Actual number of tabs depends on the object and property being viewed.

Std	Exact attribute data. If the attribute is compressed, **R-Undelete** decompresses it prior to showing.
Unlimited	Exact attribute data + free space of last cluster. If the attribute is compressed, **R-Undelete** decompresses it prior to showing.
Direct	Actual data written on the disk. If the attribute is not compressed, it coincides with the Std representation.
Allocation	Resident part of the attribute.

You may select an area in the Viewer panel and save it as a file.

To select and save an area in the Viewer/Editor panel,

1 **Right-click the beginning of the selection and select Select From on the shortcut menu**

2 **Right-click the end of the selection and select Select To on the shortcut menu**

Other ways to select an area

- Select **Select...** on the **Tools** menu and specify an area to select on the Select dialog box,

or

- Click the start point of

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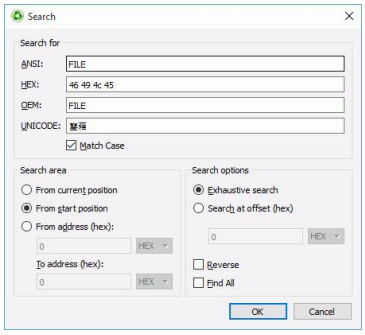
the area and drag the mouse cursor to its end.

Select **Save to Binary File...** or **Save to Hexadecimal File** on the **File** menu to save the selected data to the file.

To search for a particular string, click the **Find**, **Find Next**, or **Find Previous** buttons or the same items on the **Edit** menu, and specify the string on the Search dialog box.

Search ***dialog box***



Search options

Search for	
HEX	Field for the string to search for in the hexadecimal representation
ANSI	Field for the string to search for in the ANSI encoding
OEM	Field for the string to search for in the OEM encoding
UNICODE	Field for the string to search for in the UNICODE encoding
Match case	Select this check box to make the search case-sensitive
Search area	
From current position	Select this check box to start search from the current position
From start position	Select this check box to start search from the beginning of the object
From Address	Select this check box and specify the range in which the search is to be carried out
Search position	
Exhaustive search	Select this check box to search the entire object
Search at offset	Select this check box and specify the sector offset from which the search will start
Reverse	Select this check box to start the search in the reverse direction
Find all	Select this check box to search for all instances of the string to search. Search results will be shown in the Find Results pane.

V Data Recovery Issues

NEVER TRY TO SAVE RECOVERED FILES/FOLDERS TO THE SAME LOGICAL DISK WHERE THEY RESIDE!!!

Or you may obtain unpredictable results and lose all of your data.

R-Undelete writes directly to a hard drive only when writing recovered data and from its hex editor, if writing is enabled. In all other actions, **R-Undelete** only reads data and analyzes them, and never modifies data on the

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hard drives being analyzed.

Most operating systems use lazy-write. So, there is a time lag between file actions and actual changes on data on a hard drive. **R-Undelete** analyzes data on hard drives only. That is why it does not always detect recent changes in data structure.

Most operating systems constantly write their service information on hard drives. Such writing is especially intensive during start-up and shut-down procedures. When an operating system deletes a file/folder, it treats the space where it has resided as empty and may write something in this place. If this happened, the file/folder and its parameters may be detected correctly, but its data may be lost.

Folder names like **$$$Folder58448** on NTFS partitions mean that the folder has not been found on the drive but some references to it have been. For example, folders My documents, Work, Photos have been found and all they have one parent folder, whose description has not actually been found on the disk, so its name is unknown and therefore represented as **$$$Folder58448**. It may happen that the description of such folders was outside of the search area, so try to enlarge the region or search the entire hard drive. If that does not help, most likely that the description of the folder has been overwritten.

Folder names like **$ROOT58448** on FAT partitions mean that some folders have been found, but they cannot be included into the folder structure for this FAT partition. Sometimes, such folders may contain other folder structures.

If you recover a file, and it appears that the file contains wrong data, try to perform exhaustive search for the files on the disk

Cross-Linked Folders

Often **R-Undelete** finds several FAT folder records that contain the same data. Such folders are called *cross-linked*. **R-Undelete** marks such folders with an arrow mark:

R-Undelete attributes the content of cross-linked folders to one folder called a *target folder*. When recovering, **R-Undelete** places the content to the target folder.

To view the list of cross-linked folders,

* **Right-click a cross-linked folder and select Cross Linked Folders on the shortcut menu**

> **A list of cross-linked folders will appear**

You may go to any folder in this list by clicking it.

To find a target folder,

* **Right-click a cross-linked folder and select Go Target on the shortcut menu,** or

If **Go Target** is gray, this folder is already the target folder.

To set the target folder manually,

* **Right-click a cross-linked folder and select Set As Default Target on the shortcut menu**,

If **Set As Default Target** is gray, this folder is already the target folder.

Questionable Folders

Sometimes, **R-Undelete** may find FAT records, which look like folders, but their content is invalid. For example, file names have invalid characters, date, time, and size, or other file attributes may look strange. Please note that **R-Undelete** correctly recognizes localized names. **R-Undelete** treats such records as folders, but does not analyze their content and structure. You can manually search such folders, but results may be unpredictable. Usually, such search reveals garbage.

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R-Undelete marks such folders with a question mark. ?MP

To re-search an object,

* **Right-click a questionable folder on the R-Undelete's** Folders **panel and select Re-search on the shortcut menu, or**

VI Extended Information Recovery

R-Undelete supports recovery of compressed files, alternative data streams, encrypted files, file security and extended file attributes. If the **R-Undelete** host OS and the file system of the disk you are going to save file to support any particular extended information, it will be saved with the file, too. Otherwise, the extended information will be saved as separate files with the same name as the restored file and extension showing the type of the extended information. Below is a quick reference for the host OS and file system of the target drive.

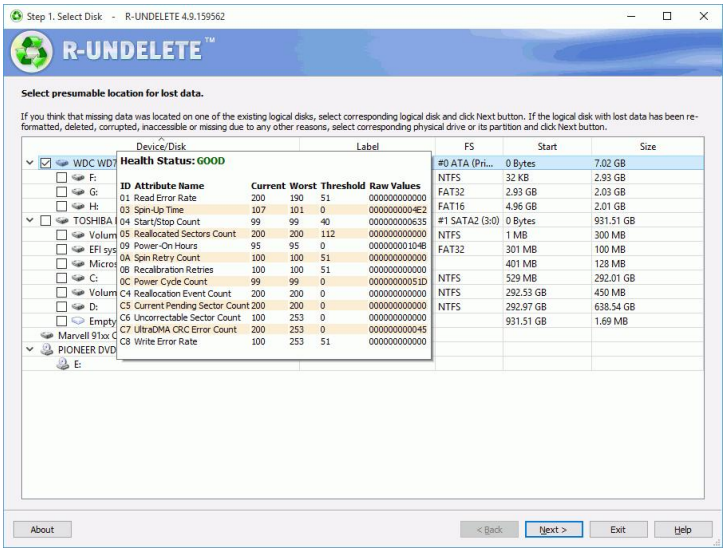
Extended Information	Required host OS	Required target disk FS
Encrypted files	Windows 2000/XP	NTFS
Alternative data streams	Windows NT/2000/XP	NTFS
File security	Windows NT/2000/XP	NTFS
Extended file attributes	Windows NT/2000/XP	NTFS or FAT

VII S.M.A.R.T. data

You may check the hardware conditions of a drive by viewing its S.M.A.R.T. data. To see it, right-click the drive and select **Show S.M.A.R.T.** on the shortcut menu.

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) is a technology widely-used in hard drives and solid-state devices that monitors their reliability conditions to predict possible hardware failures.

Device / Disk list ***panel with the S.M.A.R.T. data***


Step 1. Select Disk - R-UNDELETE 4.9.159562
R-UNDELETE
Select presumable location for lost data.
If you think that missing data was located on one of the existing logical disks, select corresponding logical disk and click Next button. If the logical disk with lost data has been re-formatted, deleted, corrupted, inaccessible or missing due to any other reasons, select corresponding physical drive or its partition and click Next button.
Device/Disk
Label
FS
Start
Size
Health Status: GOOD
ID Attribute Name Current Worst Threshold Raw Values
01 Read Error Rate 200 190 51 000000000000
03 Spin-Up Time 107 101 0 0000000004E2
04 Start/Stop Count 99 99 40 000000000635
05 Reallocated Sectors Count 200 200 112 000000000000
09 Power-On Hours 95 95 0 00000000104B
0A Spin Retry Count 100 100 51 000000000000
0B Recalibration Retries 100 100 51 000000000000
0C Power Cycle Count 99 99 0 00000000051D
C4 Reallocation Event Count 200 200 0 000000000000
C5 Current Pending Sector Count 200 200 0 000000000000
C6 Uncorrectable Sector Count 100 253 0 000000000000
C7 UltraDMA CRC Error Count 200 253 0 000000000045
C8 Write Error Rate 100 253 51 000000000000
#0 ATA (Pri... 0 Bytes 7.02 GB
NTFS 32 KB 2.93 GB
FAT32 2.93 GB 2.03 GB
FAT16 4.96 GB 2.01 GB
#1 SATA2 (3:0) 0 Bytes 931.51 GB
NTFS 1 MB 300 MB
FAT32 301 MB 100 MB
401 MB 128 MB
NTFS 529 MB 292.01 GB
NTFS 292.53 GB 450 MB
NTFS 292.97 GB 638.54 GB
931.51 GB 1.69 MB
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If drive's S.M.A.R.T. data shows warnings

In case the S.M.A.R.T. data of a drive shows hardware problems, **R-Undelete** will show a warning. You may check the S.M.A.R.T. data and decide what to do with the drive.

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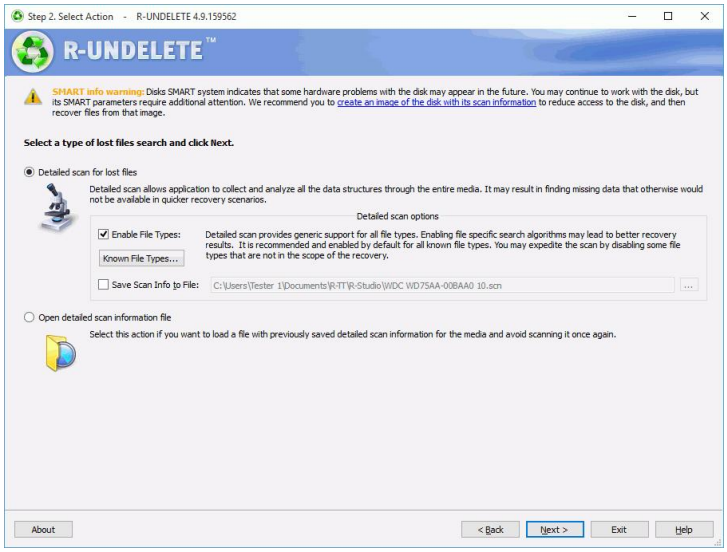
Caution S.M.A.R.T. warning


Step 2. Select Action - R-UNDELETE 4.9.159562
R-UNDELETE
SMART info warning: Disks SMART system indicates that some hardware problems with the disk may appear in the future. You may continue to work with the disk, but its SMART parameters require additional attention. We recommend you to create an image of the disk with its scan information to reduce access to the disk, and then recover files from that image.
Select a type of lost files search and click Next.
Detailed scan for lost files
Detailed scan allows application to collect and analyze all the data structures through the entire media. It may result in finding missing data that otherwise would not be available in quicker recovery scenarios.
Detailed scan options
Enable File Types:
Detailed scan provides generic support for all file types. Enabling file specific search algorithms may lead to better recovery results. It is recommended and enabled by default for all known file types. You may expedite the scan by disabling some file types that are not in the scope of the recovery.
Known File Types...
Save Scan Info to File:
C:\Users\Tester 1\Documents\R-TT\R-Studio\WDC WD75AA-00BAA0 10.scn
Open detailed scan information file
Select this action if you want to load a file with previously saved detailed scan information for the media and avoid scanning it once again.
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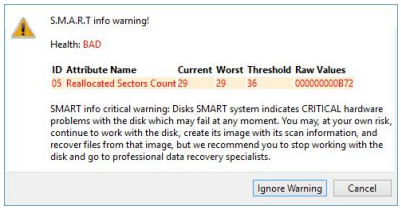
This warning indicates that there are possible some small problems with the disk in the future, you may work with it but with cautions and regular check of these parameters.

Disk imaging is recommended. You may start imaging clicking the create its image with scan information link. Then you may recover your files later from that image.

Caution S.M.A.R.T. warning


S.M.A.R.T info warning!
Health: BAD
ID Attribute Name Current Worst Threshold Raw Values
05 Reallocated Sectors Count 29 29 36 000000000B72
SMART info critical warning: Disks SMART system indicates CRITICAL hardware problems with the disk which may fail at any moment. You may, at your own risk, continue to work with the disk, create its image with its scan information, and recover files from that image, but we recommend you to stop working with the disk and go to professional data recovery specialists.
Ignore Warning
Cancel

This warning indicates that the disk conditions are critical and chances of hardware failure are great. The best recommendation for this case is to stop working with the disk and bring it to professional data recovery specialists. You may though continue to work with the disk at your own risk, but disk imaging is very strongly recommended. You may create the image by clicking the **Create Image** button. Then you may recover your files later from that image.

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